MICRONTA®

LCD Auto Range Digital Multimeter

Tom McCormick

OWNER'S MANUAL

Catalog Number 22-196

CUSTOM MANUFACTURED FOR RADIO SHACK TC A DIVISION OF TANDY CORPORATION

MICRONTA auto-ranging Digital Multimeter is a portable 3½-digit, pact sized Multimeter ideally suited for field, lab, shop, bench and e applications. Here's a review of some of the features that qualify new Digital Multimeter as a real "pro".

latest IC and display technology is used to achieve the lowest possible ponent count. This, in turn, ensures reliability, accuracy, stability and lly rugged, easy-to-handle instrument.

auto-range operation in each mode. The range will be automatically o a higher range when over-range takes place.

auto-polarity operation.

pointer to bend. No parallax and no zero adjust. Just a high contrast, -to-read, 3½ digit, liquid crystal display.

ctive overload and transient protection on all ranges.

-range indication on each range.

-slope integration to ensure fast, accurate, noise-free measurements.

SPECIFICATIONS

Display:	3-1/2-Digit, LCD
Accuracy:	
DC VOLTS 2–2–200–2000V (Maximum measurement = 1000 Volts)	±0.8% of reading and ±0.2% of full scale, ±1 digit
AC VOLTS 2–20–200–2000V (Maximum measurement = 500 Volts RMS)	±1% of reading and ±0.5% of full scale, ±1 digit
DC-CURRENT 200mA	±1.5% of reading and ±0.2% of full scale ±1 digit
RESISTANCE 2-20-200-2000K OHM	±1.5% of reading and ±0.2% of full scale, ±1 digit
Operating Temperature:	0° C to 50° C
Storage Temperature:	–20° C to 60° C
Input Impedance:	10 megohms (DC/AC VOLTAGE)
Polarity:	Automatic Polarity
Over Range Indication:	1□□□
Range:	Automatic Range with Range Hold function
Power Source:	9 Volt rectangular battery or AC Adapter (Radio Shack Catalog Number 65-731/273-1431)
Low Battery Indication:	"BT" on left side of display
Zero Adjust:	Automatic
Weight:	400g
Size:	2-1/8" x 8-7/32" x 4-1/8" (54mm x 209mm x 105mm)

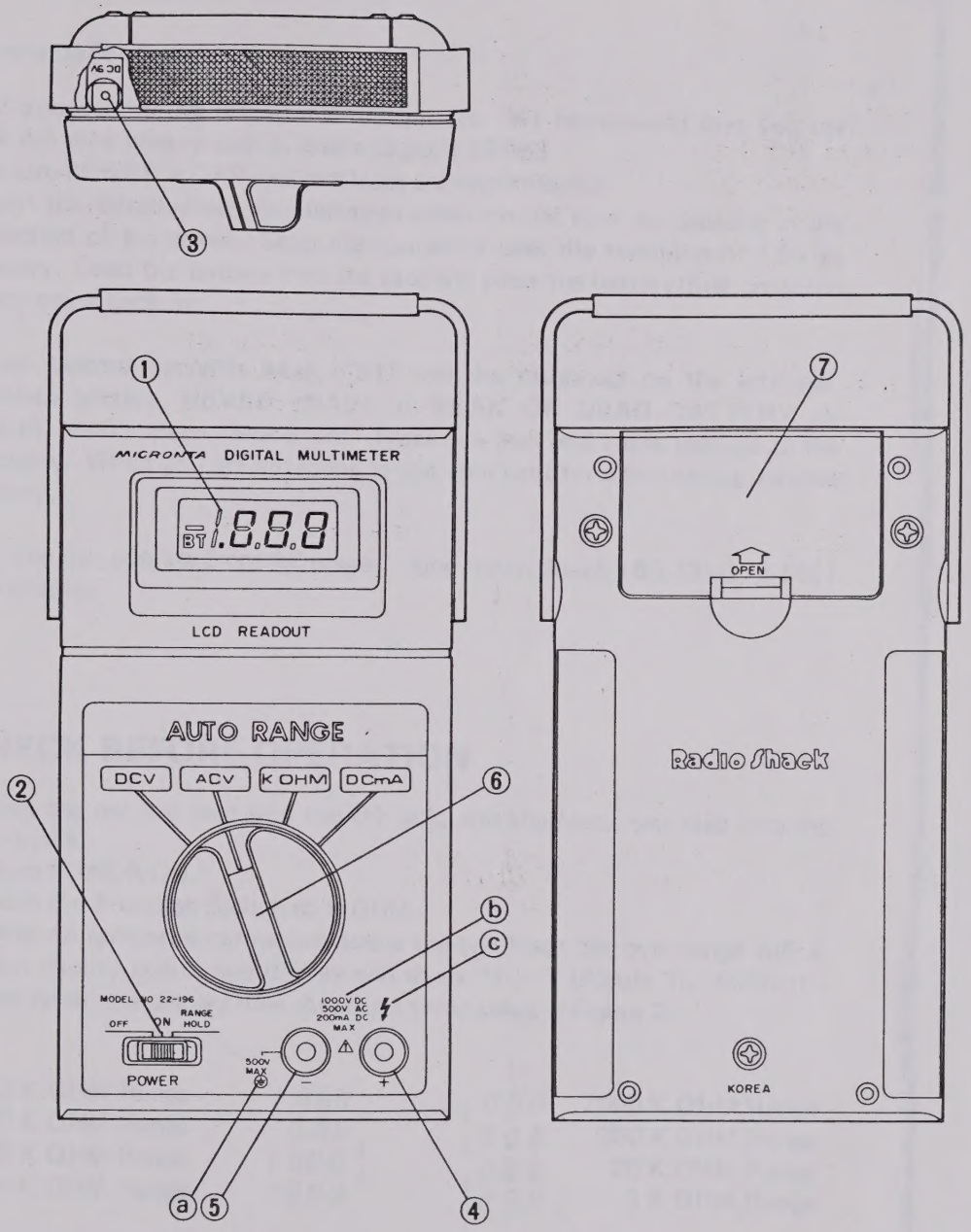
CONTROLS AND FUNCTIONS

ITEM NO.	NAME	FUNCTION
1	Display	A 3½ digit display (1999 max) with decimal point and minus polarity indication. Indicates mesured input values plus over-range and low battery condition.
2	POWER switch	Turn the instrument ON and OFF. Set to RANGE HOLD to stay in one range.
3	AC adapter jack (DC 9V)	Use with the AC adapter Radio Shack Catalog No. 65-731/273-1431.
4	Input + Jack	Connect + red lead for all voltage, current and Resistance measurements.
5	Input — Jack	Connect -- black lead for all measurements.
6	Function switch	For selecting functions: DC Volts, AC Volts, K ohms, DC mA.
7	Battery/Fuse Compartment	

EXPLANATION OF SPECIAL PANEL MARKINGS

Special labeling has been added to the panel to remind you of the measurement limitations and safety.

a. To avoid electrical shock and/or instrument damage do not connect the common input terminal (— jack) to any source of more than 500 volts with respect to earth/ground.
b. The maximum voltage or current that can be measured is 1000V DC, 500V AC, or 200mA DC.
c. Be extra careful when making measurements for high voltage; do not touch terminals or probe ends.


AC DC
3
MICRONTA DIGITAL MULTIMETER
1
BT 1.8.8.8
LCD READOUT
AUTO RANGE
DCV
ACV
K OHM
DCmA
2
6
b
c
MODEL NO 22-196
OFF
ON
RANGE HOLD
POWER
1000V DC
500V AC
200mA DC
MAX
500V MAX
a
5
4
7
OPEN
Radio Shack
KOREA

Preparing for Operation

All you need to do is load a 9-volt battery. We recommend that you use the Alkaline type – such as Radio Shack's 23-553.
Be sure **POWER** is OFF and test leads are disconnected.
Open the battery/fuse compartment cover on the rear by pressing in the direction of the arrow. Snap the connector over the terminals of a 9-volt battery. Load the battery into the case and press the battery/fuse compartment cover back on.

When battery becomes weak, "BT" will be displayed on the left side. Replace battery, NEVER LEAVE A WEAK OR DEAD BATTERY IN YOUR UNIT. Even "leak-proof" types can leak and cause damage to the circuitry. When you are not going to use your unit for a few weeks, remove battery.

Or, you can operate from AC power, using Radio Shack's 65-731/273-1431 AC adapter.

CHECK BEFORE OPERATION

1. Plug the red test lead into the (+) jack, and the black test lead into the (–) jack.
2. Turn **POWER** ON.
3. Turn the Function Switch to K OHM.
4. With no resistance connected across the test leads, the over-range indication should occur, and display will show "1 " (Figure 1). Short the test leads; the display now should be three zeros. (Figure 2)

2 K OHM Range	1.000 ↓	↓ 000	2000 K OHM Range
20 K OHM Range	10.00 ↓	↓ 00.0	200 K OHM Range
200 K OHM Range	100.0 ↓	↓ 0.00	20 K OHM Range
2000 K OHM Range	1000 ↓	.000	2 K OHM Range

Figure 1 **Figure 2**

MAKING MEASUREMENTS

DC VOLTAGE MEASUREMENTS/AC VOLTAGE MEASUREMENTS

IMPORTANT: The maximum input limit for voltage measurement is 1,000V/DC and 500V/AC (RMS).
If you attemp to measure DC voltages above 1000 volts or AC voltages above 500 volts RMS, your unit may be damaged.

1. Set Function Switch to DCV or ACV.
2. Connect the probes to the circuit to be tested. In DCV, minus sign will appear if voltage is negative (with respect to black lead).

RANGE HOLD

A special feature of your auto-ranging DMM is the range hold position of the Power Switch. If you want to hold the DMM on a specific range (for a series of measurements or to avoid range switching near limits of a range), let the Meter auto-range to the desired range and then set Power Switch to RANGE HOLD.
The Meter will remain on that range until released (set Power to ON).

RESISTANCE MEASUREMENTS

NOTE: The resistance measuring circuit applies a known value of constant current through the unknown resistance and then measures the voltage developed across it. Thus, when checking "in-circuit" resistance, be sure the circuit under test has all power removed (are all capacitors fully discharged?).

1. Set the Function Switch to the K OHM position.
2. Connect the probes across the circuit to be measured.
3. For resistances of approximately 1 Megohm and above, the Meter may take a few seconds to stabilize. This is normal for high resistance reading.

NOTE 1

Some devices may be damaged by the current applied during resistance measurements. The following table lists the voltage and current available on each range.

RANGE	A	B	C
2K	0.6	0.27	0.24
20K	0.6	0.38	0.052
200K	0.6	0.39	0.006
2000K	0.6	0.40	0.0006

A is open circuit voltage at the jacks in volts.
B is voltage in volts across a resistance equal to full scale value.
C is current in milliamps thru a short circuit at the input jacks.
All values are typical.

NOTE 2

Your Micronta Digital Multimeter has internal protection for the KOHM ranges. For over-voltages less than AC140 Volts, an internal zener diode and resistors will protect the unit from damage.

DC CURRENT MEASUREMENTS

(Do not Attempt to Measure AC Current)

To measure current, you must break the circuit and connect the leads to two circuit connection points. **Never connect the leads across a voltage source**; doing so will blow the fuse or, even worse, may damage the circuit under test.

WARNING

DON'T APPLY VOLTAGE TO INPUT TERMINAL WHILE FUNC TION SWITCH IS IN DCmA POSITION.

1. Place the Function Switch in the DCmA position.
2. **Remove power from the circuit under test** and then break the circuit at the appropriate point.
3. Connect probes to the circuit.
4. Apply power and read current.
5. If the polarity of the current being measured is negative, the value displayed will be preceded by a minus (—) sign.

NOTE
The current ranges are fuse-protected. If inoperative check the fuse.

REPLACEMENT OF FUSE

WARNING

TO AVOID ELECTRIC SHOCK, DISCONNECT LEADS BEFORE REMOVING BATTERY. REPLACE ONLY WITH SAME TYPE BATTERY.
OPEN CABINET ONLY WHEN BATTERY AND/OR FUSE REPLACEMENT IS NECESSARY. DON'T TOUCH ANYTHING INSIDE OTHER THAN BATTERY AND/OR FUSE.

NOTE:
The fuse used in your Digital Multimeter is a special size and type. It can only be ordered from Radio Shack's National Parts department. Contact your local Radio Shack store to place such a special order.

1. Be sure **POWER** is OFF and test leads are disconnected.
2. Open the battery/Fuse Compartment Cover.
3. Pull the red ribbon in the fuse compartment. The fuse will pop out.
4. Insert a new fuse on the ribbon ring. Use only a fuse of the same type/rating (1A). 5ϕx20mm Miniature fuse.
5. Install fuse with ribbon in the fuse compartment.
6. Close the battery/Fuse Compartment Cover.

MAINTENANCE

Your Digital Multitester is a precision electronic device. Do not touch any of the circuitry inside the Case. Do not expose to extreme temperatures [below –4°F (–20°C) or above 140°F (60°C)]; protect from extremely humid areas.

To avoid damage:

A. Never connect more than 1000 Volts DC or 500 Volts RMS AC.
B. Never connect a source of voltage when Function Switch is in KOHM position.
C. Never operate the DVM unless the Battery Cover is in place and fully closed (or AC Adapter is fully plugged in).
D. Battery and/or Fuse replacement should only be done after the test leads have been disconnected and **POWER** is OFF.

The Micronta DVM comes to you fully calibrated and tested. Under normal use, no further adjustment should be necessary. In case meter should require repair, do NOT try to adjust by yourself; bring it to your nearest Radio Shack store. SERVICE OF THE DVM BY UNAUTHORIZED PERSONNEL WILL VOID THE WARRANTY.

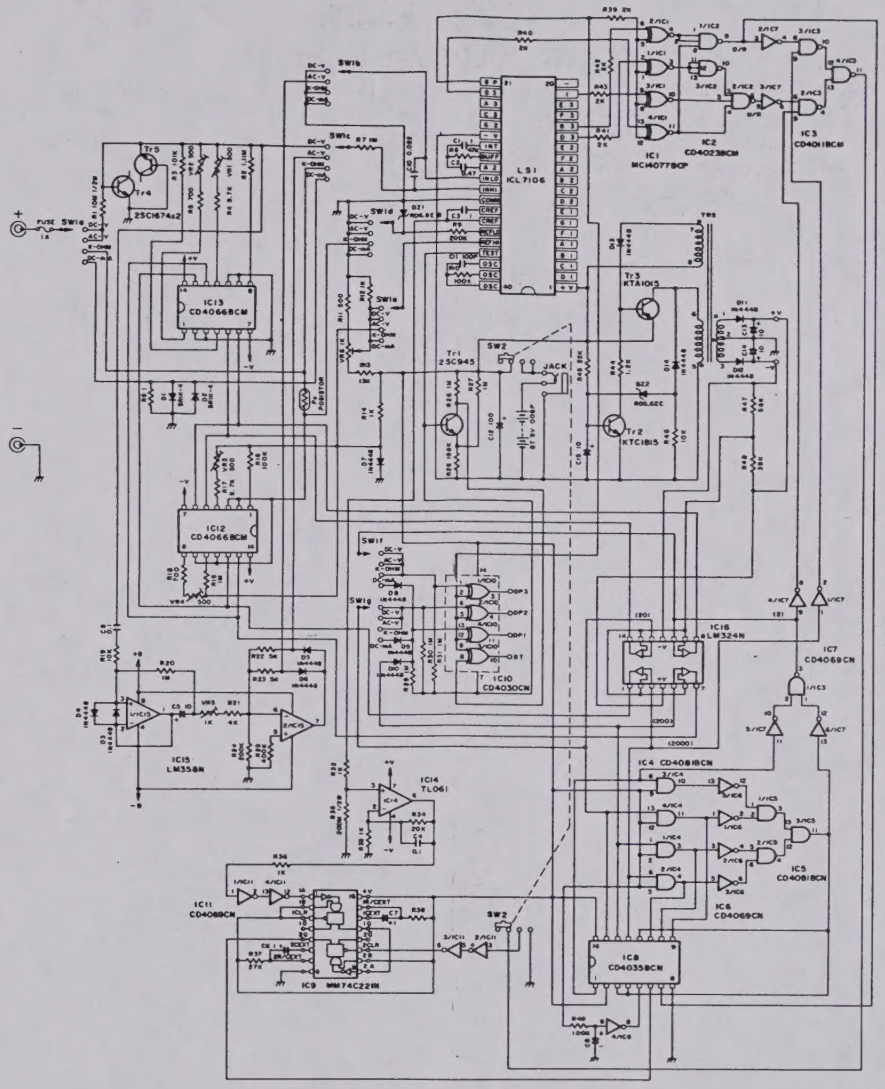
A Word About Safety

Every precaution has been taken in the design of your meter to insure that it is as safe as we can make it.

However, **safe operation depends on you,** the operator. We recommend that you follow these simple safety rules:

1. Never apply voltages to the DVM which exceed the limits given in the Specifications section. Never apply more than 1000 Volts DC or 500 Volts AC RMS between input jacks and/or ground. To do so may break down the insulation of the AC Adapter.
2. Use extreme caution when working with voltages above 100V. Always disconnect power from the circuit being measured before connecting test leads to high-voltage points.
3. Always discharge filter capacitors before attaching test leads to a power supply.
4. Get into the habit of keeping one hand in your pocket when troubleshooting any equipment containing high voltages.
5. Since many AC-DC sets have a potentially "hot" chassis, be sure that the top of your workbench and the floor underneath it are dry and are made of non-conductive material.

SCHEMATIC DIAGRAM



NOTE:

(1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K = 10^3 OHM, M = 10^6 OHM)

(2) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" (P = 10^{-6} μF)